INL's new 91,000-square-foot Energy Systems Laboratory will accommodate growing energy research capabilities in biofuel feedstocks, energy storage, advanced vehicle and battery analysis, hybrid energy systems, and nuclear energy research support.

New Energy Systems Laboratory delivered

By Reuel Smith and Keith Arterburn, *INL Communications & Governmental Affairs*

Idaho National Laboratory's landscape is changing, again. A new facility is delivering more capabilities along Idaho Falls' University Boulevard to serve growing programs.

"The new Energy Systems Laboratory delivers a state-of-the-art facility that adds to the already highly competitive capabilities INL possesses in energy research and development," said Randall Bargelt, INL's acting director of Project Management. "Working with Ormond Builders, we were able to begin and deliver this 91,000-square-foot facility on time and within budget."

The new analytical lab space at INL's Energy Systems Laboratory.

On Oct. 12, INL began occupying the new building at 750 University Boulevard, which is referred to simply as ESL.

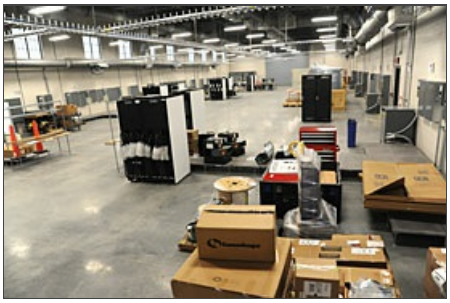
"We are pleased to move into this high-tech facility, which will add to our growing energy research capability in biofuels, energy storage and advanced vehicle analysis," said Steve Aumeier, associate laboratory director for Energy and Environment Science & Technology. "It also advances our research in hybrid energy systems, building on our experience in nuclear energy research and permitting us to connect it to a variety of energy sources for testing and validation.

"Already, about 75 to 80 percent of the space in the ESL is filled," Aumeier added. "ESL is a key part of the modern campus our researchers need to compete in the coming decades. We owe it to them to provide the best facilities and equipment as we grow our programs."

The purpose of leasing this new facility is to provide new, leadership-class work spaces and tools to researchers in order to reduce technical and economic risks associated with the deployment of new energy technologies. ESL will move new energy security concepts from the realm of scientific and engineering investigation to the marketplace of commercially scalable and economically viable industrial processes.

"In addition to finishing the facility on time, we will encounter several challenges in relocating about 47 people from a variety of current locations into the new building, along with relocating more than 150 pieces of equipment," said Tim Beseris, project manager for the relocation of equipment and employees.

"We won't have completed all employee and equipment moves until March 2013 because of the complexity of the relocations. Fortunately, we have had excellent cooperation from Dr. Aumeier's team and key subcontractors who will be installing the new equipment."



The ESL's High Energy Battery Test Center will expand DOE's ability to evaluate advanced battery technologies.

The new building has four principal areas that include a two-story office/laboratory module, a Process Demonstration Unit high-bay module, a Hybrid Energy Systems Testing (HYTEST) high-bay module and battery laboratory module. The building is designed to qualify for the Leadership in Energy and Environmental Design (LEED) gold status designation. For example, it captures natural lighting throughout the interior of the building, uses recycled materials and employs local vegetation in its landscaping.

"With four large 1,500-KV transformers located on the exterior of the building, each high-bay module has 3,000 amps of 480-volt three-phase power available," said Beseris. "Looking to the future, solar panel mountings have been built into the roof structure for research projects."

"The ESL addition will significantly enhance our testing and demonstration capabilities for biofuels, renewable energy, energy storage, transportation technology analysis, and our HYTEST Program," said Richard Hess, division director for Energy Systems and Technologies.

"This new facility and its surrounding acreage are ideal for our advanced bioenergy feedstock supply research, development and demonstration, which has a 27,000-square-foot high bay space with 40-foot ceilings," Hess said. The location also provides about four acres of space outside to set down and store materials.

Based on a concept that recognizes the unused assets of nuclear energy systems, the Hybrid Energy System's HYTEST seeks to leverage the advantages of various energy sources, including renewable, conventional and unconventional fossil to obtain as much energy as possible and leave little or none wasted.

"A significant purpose of the HYTEST lab is to reduce both technical and economic risks associated with energy systems of the future," said Aumeier, who has worked with his team on developing HYTEST for several years. "This will expand the application of nuclear, while cost-effectively integrating renewable resources."

This ESL high-bay module will enhance testing and demonstration capabilities for INL's Hybrid Energy Systems Testing Program.

As engineering projects go, HYTEST is quite complex, involving thousands and thousands of internal systems in energy sources, operational calculations, data analyses and adaptations. Each of the HYTEST energy combinations differs considerably, but revolves around five general areas – feedstock processing, heat transfer and energy integration, byproducts and process control.

Hess also noted, "The new High Energy Battery Test Center at ESL will significantly expand the DOE's ability to evaluate new battery technologies." Advanced batteries that live longer, are safer and more cost-effective are critical to the nation's long-term goals to deploy large numbers of electric-drive vehicles.

"We designed ESL and know that it will help us in our quest to provide the energy industry exceptional help in overcoming many of the key challenges in working toward making America less energy-dependent on imported petroleum," Hess said.

Beseris said, "The facility has several other interesting features, including special reinforced flooring and ceilings to accommodate the possible addition of a six-sided virtual three-dimensional display system for advanced computational engineering and modeling, known as a Computer Assisted Virtual Environment, or CAVE. If funding for this large virtual display is identified, it would join an existing CAVE at the Center for Advanced Energy Studies (CAES).

"INL's strategy for adding facilities like ESL is to provide modern, well-designed and adaptable capabilities for INL's growing and expanding energy research missions," Beseris summarized.

(Posted Oct. 15, 2012)

Feature Archive